

Trip Report—WPEC and Expert Group Meetings

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Introduction

Jeremy Conlin and Wim Haeck attended the 31st meeting of the [Working Party on International Nuclear Data Evaluation Co-operation](#) (WPEC) and the associated subgroup meetings. Los Alamos has been an active participant in WPEC for many years and has been a leader in several of the subgroups. Participation in WPEC provides a means whereby nuclear data experts at LANL can share their ideas and code capabilities with an international audience. The conversations and collaborations from these meetings lead to improved capabilities and understanding of nuclear data both at LANL and with our international partners. Here we report on our participation in those meetings.

Subgroups

We participated in several different subgroups as part of our participation in WPEC. Subgroups are how WPEC is organized, with each group being tasked with a specific, short-term deliverable.

Subgroup 43—Code infrastructure to support a modern general nuclear database (GND) structure

Jeremy is the co-chair of Subgroup 43 with Caleb Mattoon of LLNL. We just completed the second (of three) year of the project. Reports were made by LLNL, ORNL, and LANL about the progress towards developing an implementation of GNDS and an Application Programming Interface (API) so that a user can access the GNDS data. We reported that LANL has ideas on how to do this, but we don't have the resources (i.e., time, money, and people) to do so. We presented what we will do when we have the resources. LANL's approach was well received as a simple and understandable way to access the GNDS data without knowing the intimate details of the format.

There was some discussion about whether we should ask for a one-year extension for the subgroup. We would like an extension if there was something we could accomplish in that year that we've been unable to do so far. It wasn't clear at this point whether there was something that we could do in that much time that would significantly contribute to the adoption of GNDS. Many of the tasks of Subgroup 43 could (and probably should) be folded into the Expert Group on GNDS. We will revisit this sometime this year and determine whether we should close-up Subgroup 43 at the May 2020 WPEC meeting or whether we should ask for an extension.

In short, Subgroup 43 is making a great deal of progress towards developing tools to facilitate the adoption of GNDS by the greater nuclear data community. LLNL has some working implementations and ORNL is making progress. LANL is the furthest behind in this endeavor and need some resources to catch up.

Subgroup 45—Validation of Nuclear Data Libraries (VaNDaL) Project

The WPEC SG45 subgroup or VaNDaL (Validation of Nuclear Data Libraries) is working on providing Quality Assured benchmark input files for different calculation codes (e.g. MCNP, COG, etc.) for nuclear data library validation. During this year's meeting, a number of topics were discussed, such as licensing and reuse of the input files, the python coding developed at LANL for doing the output processing for different codes and the JSON format for exchanging results between different codes.

Morgan White proposed the licensing for the resulting input files, essentially allowing for non-commercial use of the input files and requiring users to provide changes and corrections that have been made to them.

Wim Haeck presented the python coding and the JSON format proposed for exchanging results between users and applications. The rationale behind this approach is that while every calculation code gives its result in its own format, the results we are interested in are however the same. As a result, calculation results can be split into two components: attributes (or metadata) that give information about the result (what type of result is it, what nuclide and reaction is it for if it is a reaction rate, etc.) and the actual calculation result (values for the result, optional uncertainties, the structure of the result and optional units for the values and uncertainties). The attributes are what we will search and filter on while the actual results are what we will want to compare, store, exchange, plot, etc.

Expert Group—Generalized Nuclear Database Structure

An Expert Group is a semi-permanent subgroup of WPEC for projects with a lifespan of more than a few years. The Generalized Nuclear Database Structure (GNDS) is intended to exist for several decades, it needs a group to manage the format. This Expert Group is tasked with just this.

The Governing Body of EG-GNDS is made up of two representatives from each of the major nuclear data groups around the world; i.e., ENDF, JEFF, JENDL, CENDL, etc. The Governing Body authorizes the different changes to GNDS that are proposed by various institutions. Jeremy Conlin served as one of the representatives for the ENDF group.

The Governing Body vote to accept the documents describing GNDS 1.9 as they are (with some cleanup needed). Few were entirely comfortable with this as the documents are several hundred pages in length and cannot be easily digested. Nevertheless, nobody could see a reasonable alternative.

There was considerable discussion about how changes to GNDS should be proposed, discussed, and approved in an orderly manner. There was general agreement that using git branches with pull requests will fulfill the needs nicely.

The NEA has done a great service by providing a git server (<https://git.oecd-nea.org>) where we can host the various documents that describe the GNDS format. This server is ideal because we can limit access only to those who need to have access to it and can control when the documentation is published. There were concerns in the past about using other services (e.g., GitHub, Bitbucket, etc.) as many institutions do not allow publishing in an open format without a release procedure. This git server provided by the NEA solves this very well.

In addition to providing a location where GNDS documents can be worked on without external exposure, the git server also provides some very nice tools to manage the pull requests that are needed for making proposals to the format.

The meeting was a success as it provided a recognized formal path for making changes and updates to GNDS as well as the first official adoption of a standard.

WPEC Meeting

On June 27–28, the official WPEC meeting was held. This meeting is made up of the chairs of each of the active subgroups as well as representatives of the major nuclear data groups around the world. Each had an opportunity to present a short report on their subgroup.

Two new subgroups were proposed and accepted at this meeting:

- Advances in Thermal Scattering Law Analysis
- Reproducibility in Nuclear Data Evaluation

The Thermal Scattering Law subgroup is of particular interest to LANL as there is interest in improving thermal scattering capabilities at LANL. We intend to be active participants in this subgroup in the future.

The next WPEC meeting (and associated subgroup meetings) will be held at NEA Headquarters May 11–15, 2020. We intend to continue to be an active participant in these meetings.

Additional Meetings

In addition to the WPEC meetings, Wim Haeck attended a few other informal meetings.

[Side meeting at IRSN \(July 1 and July 3\)](#)

As part of the VaNDaL project, all organisations providing input files were asked to provide their QA documentation for those input files. IRSN has a rigorous QA procedure in place but all of the documentation has however been written in French. The purpose of this side meeting between Wim Haeck and Nicolas Leclaire (IRSN) was to translate that document into English and annotate it where required (e.g. to detail some of the workings of MORET, IRSN's Monte Carlo code applied to criticality safety). The document has been fully translated and will be released as an official LANL document.

[Side meeting at OECD/NEA on decay heat benchmarking \(July 2\)](#)

Wim Haeck also attended a side meeting at the OECD/NEA on drafting a guidance document for decay heat benchmarking. This is a follow up of a previous WPNCs working group on a blind test for decay heat calculations. The purpose of the new group would be to draft a guidance document similar to the guidance document for analyzing spent nuclear fuel samples published in the framework of the SFCOMPO database.